

Serial No.: 10/066,124

Attorney Docket No.: 01-40 US

REMARKS**STATUS SUMMARY**

Claims 1-14 are pending in the present application. In accordance with the above-identified Office Action, claims 1-14 presently stand rejected. Claims 1, 5, and 8 are currently amended herein.

CLAIM REJECTIONS - 35 U.S.C. § 103

Claims 1-14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,259,091 to Eiden et al. (hereinafter "Eiden et al.") in view of U.S. Patent No. 6,570,153 to Li et al. (hereinafter "Li et al."). The Examiner presently contends that "it would have been obvious to one of ordinary skill in the art that Eiden's (091) ion gating lens can be modified to utilize two separate electrodes in accordance with Li (153), to provide ion deflection capability, thereby increasing gating and mass selectivity." Applicants respectfully traverse this rejection because Eiden et al. and Li et al. in combination fail to teach, suggest, or provide motivation for each and every element or feature recited in each of the rejected claims.

Claim 1 is directed to an "integrated ion focusing and gating lens for use in a mass spectrometer." Claim 1 recites "first and second members forming a generally cylindrical configuration". In order to clarify an aspect of the invention defined in claim 1, claim 1 has been amended herein to recite that ion flow is deflected "when said members are biased with respective voltages of opposite polarities"

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Eiden et al. disclose a mass spectrometer in which an ion beam is directed through the apertures of conventional lens elements (70) and (80). *See, e.g., Eiden et al.*, Figs. 1 & 3. As a general matter, while Eiden et al. mention that a lens element could be constructed as a cylinder, they do not disclose or suggest any type of design for a split cylinder configuration. As noted by the Examiner, "Eiden et al. . . . does not disclose the use of a gating/deflector lens comprising first and second members forming a generally cylindrical configuration, as recited in Claims 1, 5 and 9." Applicants further note that the gating structure and technique disclosed by Eiden et al. do not entail "deflecting an ion flow when said members are biased with respective voltages of opposite polarities" as recited in claim 1. The disclosure of Eiden et al. appears to be directed primarily to the use of reagent gases in a collision cell provided with their apparatus. The apparatus employed is otherwise a conventional, off-the-shelf mass spectrometer. Specifically, the gating structures and techniques are conventional, relying on the creation of potential differences between different lens elements positioned upstream and/or downstream from each other. *See, e.g., Eiden et al.* at col. 10, lines 58-67; col. 12, lines 4-5 ("The lens stack 60 is operated at potentials recommended by the manufacturer"); and col. 10, lines 14-20.

Li et al. disclose a mass spectrometer. Referring to Figure 1 of Li et al., their mass spectrometer includes a single quadrupole mass analyzer (24) that receives ions from an ion source (12). An ion gate (14) and an ion deflector (18) are interposed between the ion source (12) and mass analyzer (24). The ion gate (14) is a conventional plate with an aperture (14a) aligned with the optical axis. The ion deflector (18) consists of a pair of ion deflection plates (20) and (22) arranged parallel with the optical axis. As regards the

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invention recited in claim 1 of the present application, applicants respectfully submit that Li et al. fail to disclose an arrangement of electrodes or lenses sufficient to cure the deficiencies of Eiden et al.

As an initial matter, the gating structure and technique disclosed by Li et al. are conventional, utilizing planar geometries and not "first and second members forming a generally cylindrical configuration" as recited in claim 1 of the present application.

Moreover, the gating structure and technique disclosed by Li et al. do not entail "deflecting an ion flow when said members are biased with respective voltages of opposite polarities" as recited in claim 1. In Figure 1 of Li et al., the ion deflection plate (22) has a voltage of (U_1) and the ion deflection plate (20) has a voltage of (U_2). It can be seen from Figure 3 of Li et al. that during the fragment detection stage of operation, in order to deflect fragments exiting the mass analyzer (24) toward the offset-positioned ion detector (34), the voltage (U_1) is lowered relative to the voltage (U_2). *See also* Li et al. at col. 9, lines 66-67 to col. 10, lines 1-5. That is, Li et al. fail to teach, suggest, or provide motivation for biasing their ion deflection plates (20), (22) to opposite polarities in order to deflect ions. *See, e.g.*, the present application at p. 4, lines 4-5 & Figure 4.

The only other deflection accomplished by Li et al. appears to be the deflection of fragments in the region of their ion collision/storage cell (30) located downstream from the mass analyzer (24). This deflection occurs after molecules have already been analyzed or selected in the mass analyzer (24) and then fragmented in the ion collision/storage cell (30). *See* Li et al. at col. 8, lines 5-8 and col. 9, lines 45-50. Moreover, this deflection entails a 180° reversal of the path of the fragments, which is a type of deflection technique

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distinguished in the present application as a prior art technique sought to be avoided. *See* the present application at p. 1, lines 30-34 to p. 2, lines 1-2.

It will further be noted that the deflection schemes are discussed by Li et al. only insofar as they relate to their goal of providing a mass spectrometer with "tandem mass spectrometry" capability using only a single quadrupole mass analyzer. There is no suggestion of any need to improve upon the gating of ions prior to entry into an ion trap or other type of mass analyzing device. Thus, the application of the teachings of Li et al. to that of Eiden et al. would not reasonably lead one of ordinary skill in the art to successfully arrive at the invention claimed in claim 1 of the present application.

Claims 2-4 depend from claim 1, and therefore are distinguishable over the cited prior art references for the same reasons.

Independent claim 5 has been amended in a manner similar to claim 1. Claim 5 is distinguishable over the cited prior art references for the same reasons as regards claim 1.

Claims 6-7 depend from claim 5, and therefore are distinguishable over the cited prior art references for the same reasons.

Independent claim 8 has been amended in a manner similar to claim 1. Claim 8 is distinguishable over the cited prior art references for the same reasons as regards claim 1.

Claims 9-14 depend from claim 8, and therefore are distinguishable over the cited prior art references for the same reasons.

In view of the foregoing, applicants respectfully submit that claims 1-14 are patentable under 35 U.S.C. § 103(a) over Eiden et al. in view of Li et al., and request that the rejection be withdrawn at this time.

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CONCLUSION

In light of the above amendments and remarks, it is respectfully submitted that the present application is now in proper condition for allowance, and an early notice to such effect is earnestly solicited.

If any small matter should remain outstanding after the Patent Examiner has had an opportunity to review the above Remarks, the Patent Examiner is respectfully requested to telephone the undersigned patent attorney in order to resolve these matters and avoid the issuance of another Official Action.

Respectfully submitted,

THE ECLIPSE GROUP

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